

Application Serial No. 09/596,851

Attorney Docket No. 99-109RCE2  
PATENTAmendments to the Claims

Please substitute the following claims 1-76 as replacement claims for the previously-pending claims. Claims 16 and 70 are amended.

## Claims 1-15. (Cancelled)

16. (Currently amended) A method of screening potential catalysts for polymerization performance wherein the polymerization performance of the potential catalysts is determined for at least a first monomer as a predictor for the polymerization performance of the potential catalysts for at least a second monomer, the first and second monomers being different from each other and the first monomer being an olefin other than ethylene, the method comprising:

concurrently reacting an array of at least 8 potential polymerization catalysts that are different from each other with ~~at least~~ only the first monomer and not the second monomer under polymerization conditions in a first reaction;

determining the polymerization performance of each of the at least 8 potential catalysts reacted with the at least first monomer in the first reaction;

identifying one or more catalysts from the at least 8 potential polymerization catalysts based on the polymerization performance of the catalysts in the first reaction;  
and

reacting the one or more identified catalysts with the first and second monomers under polymerization conditions in a second reaction.

17. (Canceled)

18. (Cancelled)

19. (Original) A screening method according to Claim 16 wherein the step of determining the polymerization performance comprises measuring a characteristic of the reaction products.

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20. (Withdrawn) A screening method according to Claim 16 further comprising the step of polymerizing the at least second monomer using the catalyst.

21. (Withdrawn) A screening method according to Claim 20 comprising polymerizing the second monomer in commercial quantities.

22. (Withdrawn) A screening method according to Claim 16 wherein the step of determining the polymerization performance comprises analyzing the polymer using a high throughput chromatography technique.

23. (Withdrawn) A screening method according to Claim 22 comprising analyzing the polymer using size exclusion chromatography.

24. (Previously Presented) A screening method according to Claim 16, wherein the array of potential catalysts comprises a substrate having wells with each of the at least 8 potential catalysts residing in a different well of the substrate.

25. (Previously Presented) A screening method according to Claim 24, wherein the reacting steps further comprise adding other compositions to the wells other than the first or second monomers or the catalysts.

26. (Previously Presented) A screening method according to Claim 24 comprising dispensing the first monomer as a liquid into each reaction vessel that contains one of the potential catalysts prior to the step of reacting the catalyst with the first monomer.

27. (Withdrawn) A screening method according to Claim 24 comprising distributing the first monomer as a gas to each reaction vessel that contains one of the potential catalysts prior to the step of reacting the catalyst with the first monomer.

28. (Previously Presented) A screening method according to Claim 24 further comprising:

activating the potential catalysts; and

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wherein at least a portion of the at least first monomer is provided to each reaction vessel prior to activation of the potential catalysts.

29. (Withdrawn) A screening method according to Claim 16, wherein the step of determining the polymerization performance of the catalysts comprises measuring a property of any polymer sample made during the reaction step, wherein the property is selected from the group consisting of molecular weight, polydispersity index, viscosity, concentration, solvent extractables, solubility, melt flow index, glass transition temperature, melting point, percent crystallinity, density, polymer mass, polymer composition, polymer structure, polymer architecture, and combinations thereof.

30. (Original) A screening method according to Claim 16, wherein the determination of polymerization performance comprises measuring a property of the reaction mixture from any members of the array, wherein the property is selected from the group consisting of monomer concentration, monomer conversion, ratio of catalyst to monomer, light scattering, viscosity, temperature, visual inspection, intrinsic viscosity, polymer concentration, molecular weight, and combinations thereof.

31. (Original) A screening method according to Claim 16, wherein the reacting step is carried out to a predetermined point selected from the group consisting of time, monomer consumption, heat of reaction, polymer concentration, viscosity, and molecular weight.

32. (Original) A screening method according to Claim 31 and further comprising quenching the reaction at the predetermined point.

33. (Previously Presented) A screening method according to Claim 16, wherein the reacting step comprises concurrently reacting each of the at least 8 potential catalysts in the array with the first monomer.

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34. (Withdrawn) A screening method according to Claim 16, wherein the determination is used as a predictor for the polymerization activity of the potential catalysts for a co-polymerization of the second monomer with a third monomer.

35. (Withdrawn) A screening method according to Claim 34 and further comprising the step of copolymerizing the second and third monomers.

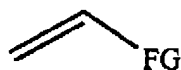
36. (Withdrawn) A screening method according to Claim 35 comprising copolymerizing the second and third monomers in commercial quantities.

37. (Original) A method according to Claim 16 wherein the first monomer is an  $\alpha$ -olefin.

38. (Original) A method according to Claim 37 wherein the first monomer is selected from the group consisting of 1-octene, 1-hexene, 1-heptene, 1-nonene, and 1-decene.

39. (Cancelled)

40. (Withdrawn) A screening method according to Claim 16 wherein at least the first monomer is represented by the formula:



wherein FG is a halogen or a functional group that contains at least one heteroatom.

41. (Canceled)

42. (Previously Presented) A screening method for high throughput screening of potential catalysts for polymerization performance for at least a second monomer, comprising:

concurrently reacting a plurality of potential catalysts arrayed on a substrate with a first monomer and not the second monomer in a first reaction, the first and second

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monomers being different from each other and the first monomer being an olefin other than ethylene;

determining a property of any polymer sample or polymerization mixture made during the first reaction at a rate of one hour or less per potential catalyst,

identifying one or more catalysts from the potential polymerization catalysts based on the properties of the samples from the first reaction; and

reacting the one or more identified catalysts with the first and second monomers under polymerization conditions in a second reaction.

43. (Original) A screening method according to Claim 42 comprising:  
concurrently reacting at least 24 potential catalysts; and  
determining properties at a rate of about 20 minutes or less per potential catalyst.

44. (Withdrawn) A screening method according to Claim 42 wherein the step of determining the polymerization performance comprises measuring a characteristic of the reaction products.

45. (Original) A screening method according to Claim 42 wherein the step of determining a property comprises measuring the concentration of the polymer formed using the catalyst.

46. (Withdrawn) A screening method according to Claim 42 wherein the step of determining a property comprises measuring the polydispersity index of the polymer formed using the catalyst.

47. (Withdrawn) A screening method according to Claim 42 wherein the step of determining a property comprises analyzing the polymer using a high throughput chromatography technique.

48. (Withdrawn) A screening method according to Claim 47 comprising analyzing the polymer using size exclusion chromatography.

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49. (Withdrawn) A screening method according to Claim 42, wherein the step of determining a property comprises measuring a property of any polymer sample made during the reaction step, wherein the property is selected from the group consisting of molecular weight, polydispersity index, viscosity, concentration, solvent extractables, solubility, melt flow index, glass transition temperature, melting point, percent crystallinity, density, polymer mass, polymer composition, polymer structure, polymer architecture, and combinations thereof.

50. (Original) A screening method according to Claim 42, wherein the step of determining a property comprises measuring a property of the polymerization reaction mixture from any members of the array, wherein the property is selected from the group consisting of monomer concentration, monomer conversion, ratio of catalyst to monomer, light scattering, viscosity, temperature, visual inspection, intrinsic viscosity, polymer concentration, molecular weight, and combinations thereof.

51. (Withdrawn) A screening method according to Claim 42, wherein the concurrent reactions are carried out to a predetermined point selected from the group consisting of time, monomer consumption, heat of reaction, polymer concentration, viscosity, and molecular weight.

52. (Withdrawn) A screening method according to Claim 51 and further comprising concurrently quenching the reaction at the predetermined point.

53. (Withdrawn) A screening method according to Claim 42, wherein the determination is used as a predictor for the polymerization activity of the potential catalysts for a co-polymerization of the second monomer with at least a third monomer.

54. (Withdrawn) A screening method according to Claim 53 and further comprising the step of copolymerizing the at least second and third monomers.

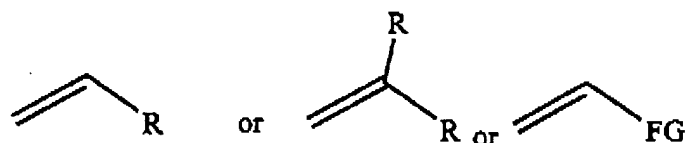
55. (Withdrawn) A screening method according to Claim 54 comprising copolymerizing the at least second and third monomers in commercial quantities.

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56. (Withdrawn) A method according to Claim 42 wherein the first monomer is an olefin other than ethylene.

57. (Withdrawn) A method according to Claim 42 wherein the first monomer is 1-octene, 1-hexene, 1-heptene, 1-nonene, and 1 decene.

58. (Withdrawn) A screening method according to Claim 41, wherein the first monomer is represented by a formula selected from the group consisting of:



wherein each R is independently selected from the group consisting of halogen, alkyl, substituted alkyl, aryl, substituted aryl, heteroalkyl, cycloalkyl, substituted cycloalkyl, heterocycloalkyl, substituted heterocycloalkyl, heteroaryl, substituted heteroaryl, alkoxy, silyl, boryl, phosphino, amino, thio, seleno and combinations thereof; and FG is halogen or a functional group that contains at least one heteroatom.

Claims 59-69. (Cancelled)

70. (Currently amended) A method of screening potential catalysts for polymerization performance wherein the polymerization performance of the potential catalysts is determined for at least a first monomer as a predictor for the polymerization performance of the potential catalysts for at least a second monomer, the first and second monomers being different from each other and the first monomer being an olefin other than ethylene, the method comprising:

concurrently reacting an array of at least 8 potential polymerization catalysts that are different from each other with at least the first monomer and not the second monomer under polymerization conditions in a first reaction;

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determining the polymerization performance of each of the potential catalysts with the at least first monomer in the first reaction by analyzing products of the first reaction; and

polymerizing the first and second monomers as copolymers or higher-order polymers in a second reaction using one of the catalysts in the array based upon the polymerization performance of the catalyst.

71. (Withdrawn) A method of screening potential catalysts for polymerization performance wherein the polymerization performance of the potential catalysts is determined for at least a first monomer as a predictor for the polymerization performance of the potential catalysts for at least a second monomer, the first and second monomers being different from each other and the first monomer being an olefin other than ethylene, the method comprising:

concurrently reacting an array of at least 8 potential polymerization catalysts that are different from each other with the at least first monomer under polymerization conditions;

determining the polymerization performance of each of the potential catalysts with the at least first monomer; and

polymerizing the second monomer with at least one of the at least 8 potential polymerization catalysts.

72. (Withdrawn) The method of claim 71, wherein the at least one of the at least 8 potential polymerization catalysts is selected for polymerization with the second monomer based on its polymerization performance.

73. (Previously Presented) A screening method according to Claim 16, wherein the polymerization performance of the identified catalysts for the first reaction has a figure of merit for a particular property.



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74. (Previously Presented) A screening method according to Claim 16, further comprising determining the polymerization performance of each of the one or more catalysts reacted with the first and second monomers in the second reaction.

75. (Previously Presented) A screening method according to Claim 42, wherein the polymer samples produced by the identified catalysts for the first reaction have a figure of merit for a particular property.

76. (Previously Presented) A screening method according to Claim 42, further comprising determining a property of any polymer sample or polymerization mixture made during the second reaction at a rate of one hour or less per potential catalyst.